Can NEMSIS Data Be Used to Understand Pre-hospital Stroke Care in Utah?

Utah Heart Disease and Stroke Prevention Program and Utah EMS Agency

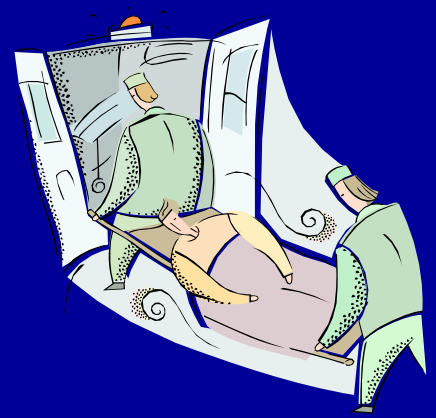
Background

- Pre-hospital Stroke Care is key in the Stroke Chain of Survival.
- Recommendations and specific measures exist to assure integration of EMS into stroke systems of care.
- Can the Utah POLARIS/NEMSIS data system be used to look at important measures of pre-hospital care?

Acker Stroke 2007

Potential Areas of Pre-hospital Stroke Care in NEMSIS

- Dispatch characteristics of stroke/modes of response
- Response times for stroke
- Use of stroke protocols and screens
- Destination hospital characteristics and locations



NEMSIS Data Elements and Pre-hospital Stroke Care

NEMSIS Code	Title	Definition
E02_02	INCIDENT NUMBER	The incident number assigned by the 911 Dispatch System
E02_04	TYPE OF SERVICE REQUESTED	The type of service or category of service requested of the EMS service responding for this specific EMS incident.
E03_01	COMPLAINT REPORTED BY DISPATCH	The complaint dispatch reported to the responding unit.
E05_02	PSAP CALL DATE/TIME	The date/time the phone rings (911 call to public safety answering point or other designated entity) requesting EMS services.
E05_03	DISPATCH NOTIFIED DATE/TIME	The date/time dispatch was notified by the 911 call taker (if a separate entity
E05_04	UNIT NOTIFIED BY DISPATCH DATE/TIME	The date/time the responding unit was notified by dispatch
E05_07	ARRIVED AT PATIENT DATE/TIME	The date/time the responding unit arrived at the patient's side
E05_09	UNIT LEFT SCENE DATE/TIME	The date/time the responding unit left the scene (started moving)
E05_10	PATIENT ARRIVED AT DESTINATION DATE/TIME	The date/time the responding unit arrived with the patient at the destination or transfer point
E09_06	DURATION OF CHIEF COMPLAINT	The time duration of the chief complaint
E09_07	TIME UNITS OF DURATION OF CHIEF COMPLAINT	The time units of the duration of the patient's chief complaint
E09_15	PROVIDERS PRIMARY IMPRESSION	The EMS personnel’s impression of the patient’s primary problem or most significant condition which led to the management given to the patient (treatments, medications, or procedures).
E14_24	STROKE SCALE	The patient’s Los Angeles or Cincinnati Stroke Scale Results
E20_01	DESTINATION/TRANSFERRED TO, NAME	The destination the patient was delivered or transferred to
E20_06	DESTINATION COUNTY	The destination County in which the patient was delivered or transferred to
E20_10	INCIDENT/PATIENT DISPOSITION	Type of disposition treatment and/or transport of the patient.

Methods

- NEMSIS data elements and definitions reviewed.
- NEMSIS Utah files with measures analyzed with data from 10/2006 to 1/2008
- Possible Stroke defined as
  - Primary Impression Stroke on scene
  - Dispatch diagnosis of stroke with no on scene diagnosis*

Urban: Salt Lake, Davis, Utah, Weber Counties

Rural : All others

* Implication: Provider agreed with Dispatch Diagnosis

Response Type for Stroke

- 799 cases met the definition of possible stroke.
- 59.7% (n=477) listed a primary impression of stroke and the remaining cases (n=322) were classified dispatched as stroke but had no other diagnosis recorded.
- Most possible stroke cases (95.9%) (n=766) listed 911 as the response type. Others were identified as inter-facility transfers or medical transports.

Total Response Time for Stroke

- Sufficient information to calculate total response times was available for 132 of 799 possible stroke cases.
  - The mean response time from **911 call to arrival at the ED** was 43.5 minutes (SD±33.8).

Other Stroke Response Times

- **EMS notification to arrival** (n=562) mean response time was 8.8 minutes.
- **On scene time** (n=561) averaged 14.3 minutes.
- **Scene to ED** (n=652) averaged 19.2 minutes.

Duration of Onset Recorded by EMS Provider

- Duration of onset was recorded for 344 of 799 possible stroke cases.
- Overall, the median duration of onset was 40 minutes.

  Urban areas, duration of onset was recorded for 57.0% (n=199) with a median time of 30 minutes.

  Rural areas, 43.4% (n=145) had a time recorded with a median time of 45 minutes.

  Rural/urban differences were not statistically significant (p=.3800).

Stroke Screen

- Only 3 positive stroke screens recorded.
- Placement of Stroke Screen has now been corrected.

Destination Hospitals

- Destination hospital identified for 676 possible stroke cases.
- In urban areas, 64.3% (222 of 345) of possible stroke cases were taken directly to one of the four certified primary stroke centers.
- In rural areas, 16.6% (55 of 331) of stroke patients were transported to hospitals with telestroke capability.

Urban Destination Hospitals Response Time by Hospital Type

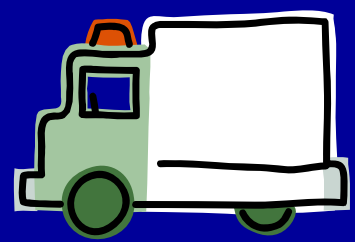
- 91 urban stroke cases included total response times from 911 call to patient arrival at ED.
  - 54 were taken to a primary stroke center with a mean total response time from 911 call to arrival at the emergency department was 50.0 minutes.
  - 37 were taken to other urban hospitals with a mean total response time from 911 call to arrival at the emergency department of 33.8 minutes.

Limitations

- Diagnosis of Stroke
- Incomplete data
- Not all EMS agencies were using NEMSIS compatible software – especially in Salt Lake Valley during the time

NEMSIS data can provide important information about pre-hospital stroke care

- Dispatch and Transport Modes
- Response times
- Use of Stroke Screens
- Destination hospitals – type, response time, location



Conclusions

- Project was a nice collaboration between the Bureau of Health Promotion (HDSPP) and Bureau of Emergency Medical Services
  - Additional projects (AMI)
  - Repeat stroke project in a year when more systems are online

- Thanks to
  - Zane Shaeffer
  - Dorothy Gohdes
  - Josh Legler
  - Peter Taillac